

**Subject:** Comments on SRKW Critical Habitat

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**To:** <orcahabitat.nwr@noaa.gov>

Esteemed NOAA Fisheries, Northwest Region:

I would like to offer you my comments on the proposed designation of critical habitat for the southern resident killer whales. I will argue that sound should be considered a Primary Constituent Element (PCE) in designating critical habitat, especially for a species that obviously uses sound for essential biological activities: foraging, navigation, and communication. Furthermore, I want to express my serious concern that the NOAA on-line documents that describe the critical habitat designation have been changing; with each un-announced revision, sound has been progressively de-emphasized or completely removed as an important habitat feature.

The case for sound as a PCE

Sound propagates so efficiently in water (as well as solids) that it must radically alter how we designate critical habitat. Under the right oceanographic conditions, sound can propagate across ocean basins (order 10,000km). Even in the complex bathymetry and hydrography of Puget Sound and environs, a typical attenuation rate is only about -10dB/km (cylindrical spreading).

This low attenuation means that even distant (~10km) human source of noise (whether a ship licensed by the U.S. Coast Guard, a Navy sonar system, or a pile driver expanding a Federally-funded port) can easily modify the proposed critical habitat by increasing ambient sound levels from typical background levels (95dB in Haro Strait). Commercial traffic in the shipping lanes of Haro Strait typically raises sound pressure levels in ~20ft of water along the west side of San Juan Island to 130dB. The Navy destroyer Shoup at a range of about 10km raised ambient noise levels in the same environment to 140dB on 5/5/03 while an unidentified sonar at a similar range increased levels to ~150dB on 4/23/03.

In your Federal Register entry (7/21/06 download) you stated "We relied on distribution patterns of whales to infer presence of PCEs." That is a glaring mistake that ignores the reality of acoustic propagation. In your own FAQ (question 1) you point out that "the ESA defines critical habitat as specific areas... outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation." The key element to consider in such areas (from the killer whales perspective!) is sound; it is essential to conserve a QUIET acoustic environment in any area where sound could propagate into occupied areas.

One could argue that acoustic impacts on the volume of water within the proposed critical habitat are transient. However, a recent report on ambient noise in Haro Strait submitted to NOAA/NMFS/NWFSC suggests that there are already sufficient human activities in or near the core habitat to elevate sound pressure levels ~20dB above background (to 115dB) about half of the time. While it remains to be seen whether such sound levels adversely modify the designated critical habitat, the anthropogenic contribution to ambient underwater noise is expected to rise as shipping and development activities continue to grow in western Washington. There is certainly some sound pressure level that

will jeopardize the killer whales' continued existence and we may already be nearing the level at which the critical habitat is adversely modified.

#### Adverse modification of NOAA documents

I was really impressed with the acoustic considerations in the 2004 status review and the Proposed Conservation Plan. There is evidence in the early versions of the Biological and Economic reports that NOAA was considering a full, fair, reasonable range of acoustic impacts and their possible mitigation, including economic costs. Over the last few months, however, many of these careful acoustic considerations have disappeared.

How sound blurs the boundaries of designated critical habitat is captured elegantly in the 2004 Status Review. Section 2.5.2 (Marine Noise/Disturbance, first paragraph) states:

"Underwater noise pollution originates from a variety of sources, including general shipping and boating traffic, industrial activities (e.g., dredging, drilling, marine construction, and seismic testing of the sea bottom) and military and other vessel use of sonar (Richardson et al. 1995, Gordon and Moscrop 1996, NRC 2003). Many of these activities occur in coastal areas and overlap with the habitat used by most resident and transient killer whale populations." (2004 Status review, 2.5.2 Marine Noise/Disturbance, first paragraph)

So what does it mean to overlap, acoustically? I think you need to grapple with this question in your proposed designation.

Since sound propagates much more efficiently in water than in air, the area defined as critical habitat must be extended beyond the area occupied by orcas so that sound sources that would otherwise be located in non-critical habitat do not adversely affect the critical habitat. It may be inconvenient from a managerial perspective, but the fact remains that sound is attenuated much less in water and rock than in air. This means that critical habitat for marine species that use sound to survive must be much more expansive than for terrestrial or aerial species that rely on sound.

Specifically, NOAA should determine that all areas less than 20 feet deep are essential for conservation because nearshore (or even onshore) environments have physical characteristics (they contain rock, sediment, and/or water) that enable sound generated there to propagate into the deeper waters occupied by orcas.

Furthermore, a precautionary approach in the open ocean (the other boundary of the proposed critical habitat) dictates that the critical habitat should extend far enough offshore (10-100 km beyond the ~200m isobath?) that typical, manageable sound sources (ships, sonar, explosions, air guns, will attenuate to reasonable (130dB?) thresholds in the occupied areas of the open coast. Moreover, Section 7 consultations in the EEZ of the U.S. (and Canada) should consider other well-known aspects of sound propagation (e.g. ducting) when mitigating acoustic impacts.

The essential features of orca critical habitat should include "sound" or at least "the propagation of sound." The 3rd paragraph of the PCE section in the Federal Register notice should begin "Resident killer whales use sound to forage, communicate, and navigate." It should go on the note (accepted scientific) estimates of active space and masking thresholds for southern residents, as well as typical source and receive levels or orca calls and echolocation clicks, echoes from prey, and anthropogenic activities (especially loud ones like explosions,

air guns, pile driving, active sonar, and vessels).

It is simply TRUE that sound made in water less than 20 deep and offshore (and even sound made on land near the water!) has the potential to adversely modify the proposed critical habitat. My elementary understanding of the ESA is that if such sound is made outside the designated critical habitat, it won't be subject to Section 7 consultation unless there is a Federal nexus and the sound "jeopardizes the continued existence" of the orcas. Does that mean only sounds loud enough to physically damage the orcas will be regulated? What about sounds that only make it impossible (or just more difficult) for orcas to communicate, navigate, or forage?

Finally, I would like some assurance that consideration of acoustic impacts and mitigation technologies will again be part of the critical habitat designation and recovery plan. For example, the Economic Report should again include items like these that went missing:

- 1) Costs of mitigating pile driving noise with bubble curtains
- 2) Timing of construction with respect to seasonal killer whale distributions
- 3) Table of costs of implementing sound reduction technologies on commercial shipping traffic in the Strait of Juan de Fuca and Puget Sound.
- 4) Estimated cost of replacing vessels with decreased noise vessels

Thank you for considering these comments,  
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University of Washington, 2003